Agricultural Equipment Safety

SAFE FARMS

SPOT THE HAZARD
ASSESS THE RISK
FIND A SAFER WAY
EVERYDAY

Manitoba

Acknowledgement

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Disclaimer

Because the application of the information in this guide may vary, the Manitoba government cannot assume any responsibility or liability for the use of this information. It is intended as a guide to basic safe work practices only. Farm operators are reminded that it is their responsibility to develop specific safe work procedures and ensure that they are followed.

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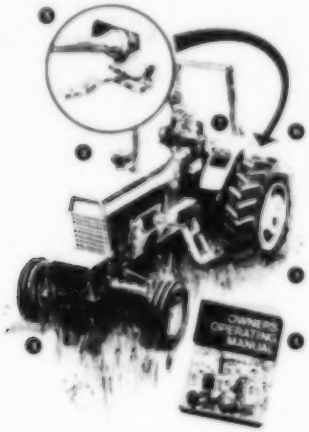
Introduction

This is a guide to controlling some of the most common hazards associated with tractor and agricultural equipment operation. It does not cover all details of safe equipment operation. For additional information or specific issues, contact your equipment supplier or the Workplace Safety and Health Division at 1-800-282-8069 ext. 2315 or SafeFarms@gov.mb.ca.

Tractor Safety Checklist

Before anyone gets into the operator's seat:

1. Be sure to read the manufacturer's operating manual. The driver of a tractor must be properly trained and fully aware of the machine's limitations and capabilities. Note and observe manufacturer's precautions.
2. When refuelling any equipment, make sure there is no smoking or open flame nearby.
3. Make a pre-operational check routine, include tires, brakes and lights. Remove mud and grease from pedals and steps.
4. Check hydraulic lines, cylinders, reservoirs and pumps for leaks. When checking pressurized lines for leaks, do not expose any skin surface.
5. Make sure the power take-off stub and shaft are guarded.
6. Make sure that no children, animals or workers are beside, under or in the path of equipment.
7. Always buckle seatbelt before driving any equipment.
8. Make sure tractor/implement sheds have ample ventilation for the start-up. Don't let equipment idle inside a shed.

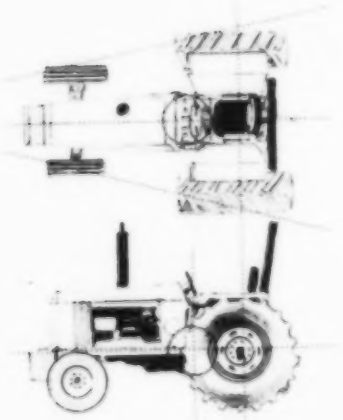


Tractor Stability

It is important to be aware of the possible changes in a tractor's stability when it's in operation. Tractors become unstable when a shift in the center of gravity moves it beyond the stability baseline. This baseline is an imaginary line connecting the outer edge of each wheel along each axle. (See diagram)

Factors affecting tractor stability:

1. Centrifugal force has a major influence. The natural force pushing outward as the tractor turns, increases with the sharpness of the turn. Doubling the tractor's speed will increase the centrifugal force by four times.
2. Mounting an implement or applying a load at the rear of a tractor will shift the centre of gravity towards the rear.
3. Raising the load also raises the centre of gravity, making the tractor less stable.
4. Crossing a slope always reduces the stability of a tractor.
5. Narrowly set wheels are less stable than wheels set wide apart.



Rollovers – Side Overturns

Thousands of farm injuries and deaths are caused by equipment rollovers. The most common hazards are:

Ditches and Embankments

Operators often get dangerously close to ditches in an effort to maximize use of the field area. If the edge of a ditch collapses, a tractor can roll in, crushing the driver or even causing drowning if the ditch has water.

To avoid this, stay clear of all drainage and irrigation ditches and slow down near them. If a ditch must be crossed, go very slowly where it is most shallow and the bank is not too steep.

Crossing Slopes

Uneven slopes are dangerous. A tractor's centre of gravity, unexpected obstacles, excessive speed, or a sudden turn uphill can all make equipment unstable and cause an upset. Avoid slopes whenever possible and drive at an angle to avoid going directly up the slope.

It is safer to back up steep slopes or ramps. Stay alert for obstructions, holes and uneven surfaces. If the tractor becomes unstable, turning downhill may be the best avoidance action.

Obstacles

Rocks, holes and fixed objects in fields (ex: stumps) can cause tractors to flip if the driver is only concentrating on a load in tow or not paying close attention. Practise caution when working in fields: remove obstacles; fill holes or depressions that could cause rollovers.

Do not carry extra riders. Look out for other workers and children and animals.

Downhill

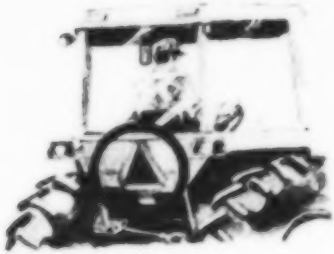
Do not coast downhill on a tractor because fast braking may be necessary, especially with a rolling load. Use a gear low enough to avoid braking. Do not turn sharply going downhill and do not use excessive downhill speed over rough spots or obstacles. Make sure brakes are working properly, to avoid jackknifing or loss of control.

Haul only as much as the tractor can control, especially if the trailing unit has no brakes.

Sharp Turns

A sharp turn without slowing down can cause a rollover. Doubling the speed increases the risk by four times. (See stability, page 4)

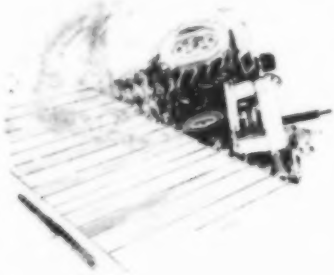
Always slow down before entering a curve and drive so that braking isn't needed on the curve. Keep loads low as they are being moved.



Public Roads

Only skilled operators with valid drivers' licences should drive tractors on public roads. About half the tractor accidents on public roads involve collisions with motor vehicles, with the tractor frequently struck from behind. Failure to equip tractors with signs that indicate a slow moving vehicle (SMV) and proper lights and signals is dangerous.

Adapt speed to the road and weather conditions. Always stop before entering a public road; turn corners slowly using signals; and drive defensively. Pull over whenever it's safe to do so, to let traffic pass, but pay attention to the condition of the road's shoulder.



Crossing Bridges

Small bridges over streams and ditches can be dangerous for tractors pulling loads, especially if the bridge is not approached straight on. Build substantial bull rails (or curbs) on any bridges on all property. They should be at least 10 inches (25 centimetres) high and capable of handling the weight of the tractor and load.

Rollovers – Rear Overturns

Once a tractor starts to turn over backwards, it is almost instantly out of control because it happens so fast. Rear overturns account for 20 per cent of tractor rollovers, they are most commonly caused by:

High Hitching

With an immovable or heavy load in tow, a high hitch exerts a pull that tends to lift the front end and let the rear wheels dig in. This can cause a backward overturn. Lugging up a steep incline will increase this risk.

Do not hitch heavy load to tractor axles, frames or gear cases. Follow manufacturers' recommendations for front-end weights and check steering response under field loads.

Stationary Loads

Pulling a stationary load or immovable object (ex: a stump or stuck vehicle) may cause a rear overturn, unless the load is hitched to the drawbar. To be safe, hitch only to the drawbar. Do not loop the line around the load and back to some other point on the tractor.

Steep Uphill Slopes

Tractors can easily flip over backwards when travelling up a steep slope or ramp. Backing up is usually the safest way to go. Add front-end weight to counter balance the backward shift of the centre of gravity if you must drive uphill.

Beware of downward pressure on the hitch caused by a heavy load. Let the clutch pedal out smoothly and be ready to disengage power quickly if the front end begins to come up. Shift to a lower gear to avoid stalling. If you must stop, apply the brakes before the forward motion ceases. Applying the brakes when a tractor is moving backwards could cause an upset.

Sudden Acceleration

Sudden acceleration can make a tractor rotate on its axle and flip backward. Always let the clutch out slowly and go slowly when accelerating on a slope.

Stuck Wheels

Tractors mired in mud or bound in any way can flip backward when power is applied to the rear wheels. Adjust speed for weather conditions to avoid getting stuck. Try to back out when stuck. Do not block the drive wheels or tie a post to wheels. If the tractor climbs over it, the post could strike the operator. If it doesn't go over the post, the tractor could flip backwards.

If possible, hitch a stuck tractor to another tractor's drawbar to pull out. Never tie a cable or chain to the rear axle, frame or other high point to pull a stuck vehicle.

Human Factors

Tractor accidents are commonly caused by a combination of these three factors:

the driver or a bystander, the tractor itself and environmental conditions. Make sure you (and the people on your farm) know all about tractor safety. Be on guard for potential dangers by paying attention to:

Training – Owners/employers must make sure that anyone who uses a tractor on their property has been properly trained before using it. More tractor accidents are caused by people than by mechanical or environmental factors.

Age – Young people may be eager to help, especially driving tractors during busy seasons. They MUST be physically capable of handling large, potentially dangerous machines safely – before they are taught to drive. Their degree of maturity and responsible attitude are equally important.

It is difficult to specify an age for older workers, but diminished reaction time, eyesight and hearing can contribute to accidents.

Health – Farmers and ranchers work long days with few breaks during peak seasons, especially at harvest. It is essential that workers get adequate sleep, water and food and take rest breaks. It is dangerous to work when fatigued.

Poor physical health can also reduce alertness. Owners/employers must ensure that each operator is capable of handling a tractor properly. Watch for irresponsible attitudes, poor judgement, showing off and individual moods. These can all lead to accidents.

Avoid – Shortcuts that ignore safety precautions are dangerous. Don't give children rides – extra riders are allowed when they're being trained. Check up on new operators regularly.

Watch for irresponsible behaviour, and don't let anyone drive a tractor whose reaction time is impaired by any type of drug, illness or fatigue.

Mechanical Factors

Poor design and inadequate safety features – particularly on older tractors – increase the risk of accidents. It's easier to lose concentration when concerned about difficult-to-see controls or if there is no weather protection on a tractor. Narrow or tricycle front wheels can cause tractors to tip easily, depending on the location of the centre of gravity.

Older tractors often lack rollover structures or proper guards. Excessive noise and vibration are distracting and cause fatigue. Exposure to excessive exhaust fumes and bad weather can make the operator less alert.

Rollover Protective Structures (ROPS)

Half the fatalities in the agriculture industry are caused by tractor rollovers. U.S research shows that since ROPS became mandatory in 1976, tractor fatalities have been reduced by almost one-third. In Manitoba all tractors used in agriculture, and built after January 1, 2001, must, by law, be equipped with ROPS.

Rollover protective structures, or ROPS, are designed to protect operators from being crushed in case of a rollover. Operators must be buckled up to help ROPS prevent injury or death.

In Manitoba, ROPS must

- meet the design and fabrication requirements of the Canadian Standards Association or the Society of Automotive Engineers
- or be certified by a registered professional engineer

ROPS must have:

- nameplates with the name and address of the manufacturer or the certifying engineer
- the model number of the machine for which the ROPS was designed
- and the name of the standards to which the ROPS conforms

Most manufacturers include ROPS with new tractors and ROPS retrofits are possible for most machines built after 1972. Be sure your tractor is fitted with the correct ROPS. Damaged ROPS must be replaced, repaired and recertified by a professional engineer.

Power Take-Off (PTO)

A power take-off can cause devastating injury when guards are not in place. Each PTO shaft – including the rear, mid or side-mounted shafts – must be guarded by a master shield. Where the attachment of PTO-driven equipment requires the removal of the master shield, a guard providing equivalent protection must be put in place.

Guards on PTOs

1. Never operate the tractor without a guard on the PTO stub shaft when it is not connected to another machine or implement.

2. The area around the stub shaft should be covered by a rigid master shield that will also cover the universal joint on the attached power shaft.

3. **Two** types of guards can be used to shield the power unit:
   - Tunnel shields are inverted U-shapes attached to the tractor's master shield and the implement. The bottom of the shaft is exposed.
   - Integral journal (or floating) shields completely enclose the shaft.
   - They are plastic tubes supported on bearings to rotate independently from the shaft. Contact should stop the tube harmlessly, without the grabbing action of revolving shafts and universal joints. It is important to keep shields free of debris, which could prevent them from rotating independently.

4. PTO-driven equipment must be guarded to prevent contact with the rotating parts of the power drive system.

5. Always disengage the PTO drive before getting off the tractor. This protects the operator from shaft rotation and moving machine parts and prevents the unexpected engagement of power by someone else while the operator is making repairs or adjustments.

6. Keep the master shield in place, replacing it immediately after connecting or disconnecting the assembly. Never operate a tractor when the master shield is not in place.

7. Make sure the integral journal (floating) shields are in good condition.

8. Never step across a rotating power shaft. When PTO-driven machines are running, walk around the revolving shaft.

Tractor Care and Maintenance

The best way to protect the considerable investment in a tractor is with regular, preventive maintenance. Daily checks and periodic service keep tractors running and make them safer. Besides the daily pre-operational checks do the following service:

Regular service

- Do lubrication and service according to manufacturer's instructions
- Replace or repair worn parts as soon as they are discovered.
- Replace all guards when service is completed.

Seasonal service

- Do an annual overhaul and service on tractors and other equipment, including winterizing.
- Thoroughly check hydraulic lines, belts, hoses, braking systems, tires and steering.
- Replace lights, warning signals and signs, as necessary.
- Check and replace all guards, including PTO when needed.

General service

- Install ROPS, making sure they are the correct ones. Check for cracks and corrosion. ROPS can be a lifesaver, if the seatbelt is worn.
- Keep exhaust and muffler systems in good repair.
- Keep pedals and steps clear of grease and mud at all times. Do not leave tools on the floor or near the pedals.
- Relieve high pressure hydraulic fluid pressure before disconnecting fittings that are not equipped with stops. A fine jet of hydraulic fluid from a pinhole leak could inject the fluid into the hand and has been known to result in damage severe enough to require amputation. Use paper for this test.

Environmental Factors

Environmental factors that can cause risk can include:

- rocks, bumps and stumps under tires
- rain or snow blowing in the face
- gases from tractor engines

These can all affect the safety of the tractor operator. Be aware of these additional safety factors: weather, surface conditions, time of day, atmosphere and tractor emissions (vibration, noise, heat).

Agricultural Machinery and Implements

Machinery and implement safety checklist:

1. Turn off all machinery power sources before doing lubrication, adjustments, repairs or other maintenance on a machine.
2. Make sure all moving parts have guards and keep them guards in place.
3. On public roads, use appropriate warning lights and slow moving vehicle (SMV) signs.
4. Wear close fitting clothing and tuck up long hair to avoid them catching in rotating equipment.
5. Keep all decals legible and in place.
6. Watch for fellow workers, children and others when operating machinery, then double-check.
7. Keep walking surfaces free of grease, dirt, frost and loose tools to prevent stumbling or slipping.
8. Be aware of high-level noise which can cause hearing loss; wear proper hearing protection (ex: ear muffs or earplugs).
9. Wear the proper personal protective equipment and clothing for the job (ex: boots with non-slip soles, heavy gloves, eye protection).
10. Read operating manuals before using or servicing any piece of equipment.
11. Always use tractors equipped with approved rollover protective structures (ROPS) and seatbelts.

Planters

- Never leave a planter in the raised position.
- Never move a planter at high speed.
- When moving a planter, use appropriate warning lights, slow moving vehicle (SMV) signs and extra caution while on public roads.
- Ensure there is enough turning space.
- Other than the operator, **nobody** is allowed on moving tractors or planters, unless factory seating is installed.
- Warn others before starting and operating a planter.
- Always lower a planter to the ground when filling seed or fertilizer hoppers.

Manure Spreaders

Spreaders are generally classified as:

(a) beater

(b) flail

(c) liquid

All three usually are pulled by a tractor and powered by the power take-off (PTO). Spreaders are a one-person operation; more than one worker on the machine can result in injury. Warn anyone who may be nearby before starting up any of the machinery.

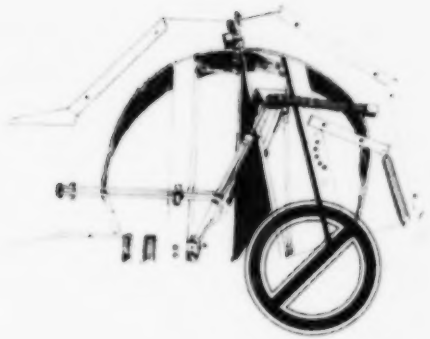
- Watch for flying debris.
- Never allow more than one person to operate a spreader; keep others well away from it.
- Do not operate a spreader unless the operator is properly seated on the tractor.
- Never let anyone ride the hitch or drawbar.
- Use locking, safety hitch pins only.
- Keep stones, boards and other solid objects out of the spreader.
- Before loading, check for frozen chains or flails and loosen with a pry bar. Do not attempt to free them by engaging power.
- Do not service spreader with the end gate open, unless it is securely blocked to prevent it from closing.

- Never enter any enclosed spreader unless there is good ventilation or appropriate respiratory protection is used.
- Do not operate at speeds other than manufacturer's recommendation.

Square Balers

Take enough time to do the job so the operator and other workers will be safe.

- Use correct ground speed; never travel too fast for conditions.
- On rough ground, slow down to prevent bouncing, which causes the knotter to miss tying.
- Disengage the PTO, shut off power source, and wait for the baler to stop before trying to unplug or service it.
- Never allow anyone to turn the flywheel while someone is working on the machine.
- Ensure that twine or wire is properly spliced and threaded in the machine. **Never** pull anything out of the knotter while the baler is in operation.
- Remove all twine before refeeding bales into the baler. Twine is too strong to break free if anyone gets entangled.
- Never feed a broken baler by hand; use a pitchfork or leave the bale on the ground and drive into it.

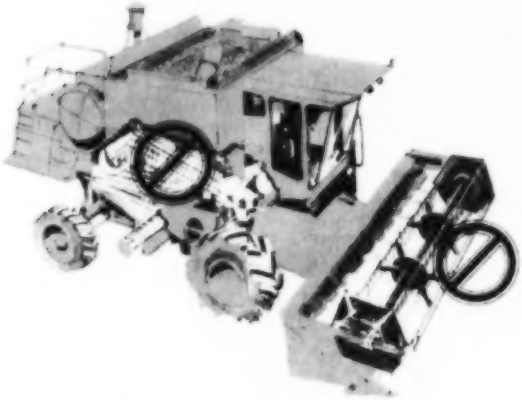


Round Balers

- Don't let anyone stand near the rear of a baler when a bale is ejected. Never eject large bales on slopes where they could roll.
- Always set the mechanical gate safety lock before entering the open rear gate area. Do not rely on a hydraulic lock.
- Relieve pressure and tension on large springs and hoses before servicing.
- Maintain proper tension on the belts. Slipping belts can cause a fire.

Mowers

- Ensure the operator is seated properly to prevent falling.
- Maintain clear vision ahead and clear any overhead hazards.
- When cutting tall grass, weeds or brush, watch for foreign objects. The speed of a rotary mower blade can injure workers 100 feet (30 metres) away by throwing out stones and other debris.
- Make sure the PTO is disengaged before starting a tractor, or before dismounting from the tractor.
- Keep hands and fingers to the back of the cutter bar and away from the knife when handling the implement.
- Never walk behind a hay conditioner while the rollers are running.
- Shut off the PTO before attempting to clean clogged rollers or perform maintenance.
- Use mowers only for the work they are designed to handle.



Combines

Plan combine operations well ahead of time. Get the proper tools, equipment and attachments ready before the season starts. Check for field obstructions and adequate turning spaces. Make sure there is sufficient space between overhead electrical lines and the equipment.

- Avoid operator stress and fatigue by doing preparation work and regular maintenance to reduce the number of breakdowns and plug-ups. Use the proper tools and equipment recommended by the manufacturer.
- Do not work under the header or other elevated parts until they are locked, latched and blocked on a level, firm surface. Keep hands away from pinch points.
- Never service a combine with the engine running, except when otherwise specified in the operator's manual.
- To check tailings, use the inspection ports provided and do not try to collect samples by opening the door at the bottom of the tailings elevator. Disconnect the straw spreader or chopper before making performance checks at the back of a combine.
- Shut off all power before attempting to unplug any part of a combine and use the proper tools for the job.
    - Weeds, wet conditions and ground speed can be hazardous, so slow down around, or avoid, these kinds of areas to minimize plugging.

- Reduce speed before applying the brakes. On self-propelled models, quick stops can make a combine nose forward.
    - Use the brake pedal lock that couples the pedals together when moving a combine. Keep the header as close to the ground as practical for better vision and weight distribution.
- Release all hydraulic pressure before disconnecting any lines.
- To avoid upsets caused by instability, do not turn or brake too sharply or allow side-slipping on hills. The fuller the grain tank, the higher the centre of gravity. Ditches or holes can also cause an upset.
- Stay out of grain tanks when combines are running.
- Prevent possible fire in a combine by checking for and replacing faulty wiring. Monitor and adjust slipping belts. Check bearing points for heat. Clean chaff and dirt from the engine and exhaust regularly.

Grain Drills

- Never allow riders on machinery while seeding.
- Never clear plugged runs while moving.
- Lower the drill and lock it out before maintenance.
- Use the transport equipment provided, including blocks and wedges.

Grinder-Mixers

- Wear proper respiratory protection to avoid excessive dust.
- Watch for and avoid overhead power lines.
- Ensure the PTO is adequately guarded and that no one steps across it.

Front-End Loaders

- Carry the loads lower down.
- Back down all slopes.
- Keep speed to a maximum of four miles an hour (six kilometres an hour) when the bucket/fork is loaded.
- Check often for excessive machine stress, including cracking and wear on the front end and tires.

- Ballast the tractor as required to handle the load.
- Never allow anyone to work below a raised mobile bucket.
- When handling bales, ensure that the bale is speared and secure. Do not allow it to fall back onto the operator when the loader is raised.

Moldboard Plows

- Lower plows and release all hydraulic pressure when not in use.
- Before disconnecting a plow, make sure it is stable.

Rotary Tillers

- Never use a free-wheeling gear on a rotary tiller.
- Maintain forward vision and stay clear of overhanging hazards.
- Disengage the PTO before starting a tractor and before getting off of it.
- Ensure the blades have stopped before servicing a tiller.
- Use tools or hand protection when cleaning out debris. Block the tiller when it is in the upward position.
- Never attempt to make adjustments to a machine or over-reach from the operator's position.

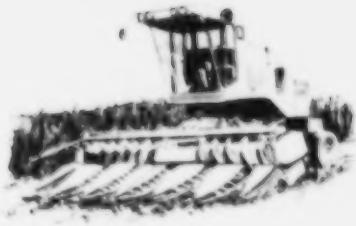
Miscellaneous Tillage Equipment

- Check for overhead hazards and slippery conditions to prevent falls from equipment.
- Make sure controls are easy to reach and that they are used from the operator's seat. An operator must remain in the tractor seat until the equipment has stopped.
- Never get off a tractor until the PTO is disengaged and all equipment has stopped. **Shut off all power sources.**
- Never stand between a tractor and a machine when hitching unless all controls are in neutral and the brakes are locked.
- Use the drawbar when hitching drawn equipment to the tractor. Never hitch it to an axle housing or three-point hitch upper link.

- Back a tractor past the clevis, then move forward so that it will be moving away from the equipment when the hitch pin is inserted and secured.
- When operating a four-wheel drive tractor with articulating steering, never stand between the tractor and the implement. If the steering wheel is moved, the tractor and implement can move, even when the tractor is in the park position.
    - Some machines are extremely heavy and need extra caution when being used on the three-point hitch. Make sure stabilizers are installed when using hydraulic lift links. Make sure mounting pins are tight and secure.
- Use front-end weights when required. Do not work under raised, unsecured implements – block them first. Lower these implements to the ground before leaving the site.
- Ensure that ample clearance is allowed for turns (including dual wheels) when attaching towed equipment so it doesn't climb up the rear tractor tire.
- Ensure that everyone is clear when moving or turning equipment and avoid short turns.
- Folding-wing equipment gives machinery a different shape and presents new hazards. Check overhead clearance for power lines – at least10 feet (three metres) from the equipment.
- Make sure any elevated or lifted machinery and the machine itself are secured and make certain no one is underneath while the equipment is hydraulically suspended.
- Make sure that transport locks are used.
- Dust conditions should be controlled by proper cab ventilation. Operators should wear approved respiratory personal protective devices if there is no cab.
- Make sure all hydraulic hoses are the right length so they do not become caught on other objects.

Augers and Elevators

- Make sure the operator/owner and anyone else on the farm is familiar with the hazards of augers and elevators.
- Consult the operator's manual for operation and all maintenance.
- **All drive mechanisms and auger intakes should be fully guarded.**
- Position elevators so that bales and chaff fall freely from the end.
- Do not start elevators or augers while others are near.
- Never start a drive [illegible]ine by pulling the belt.
- Avoid upending by using a safety device to limit the height (ex: a safety stop or red line on the cable marking the danger point). Support-arms should be positioned properly on portable elevators and ensure cables are not be frayed or partially cut.
    - Keep cable clamps tight and always have at least two turns of cable on the drum of the windlass.
- Do not allow cranks to release and spin freely, and never try to stop a spinning crank. Maintain a safety clutch on the windlass.
- Transport portable elevators and augers in the lowered position with the safety locking device in place. Avoid short turns where tractor tires could hit the elevator. Maintain a safe speed and use a flag to mark the end of elevators when moving them.
- Watch for overhead power lines and keep a minimum distance of 10 feet (three meters) from power lines.
- **Never** ride on or climb an elevator.

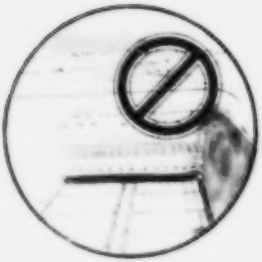


Corn Harvesters

- Maintain the manufacturer's guards, plus any other guards on tractor-mounted units.
- Reduce the chances of machine plugging by using proper ground speed. Adjust snapping rolls and gathering chains for proper stock feeding.
- Disengage power and shut off the engine before dismounting or attempting to unplug or service a harvester.
- Never turn too sharply, especially on side hills.
- Do not stand up while operating a harvester.
- Keep steps and platforms clear to lessen the chance of falling off.
- Prevent fires by using radiator screens. Shield the manifold and muffler from leaves and other flammable material. Provide a fire extinguisher on the equipment.

Posthole Augers and Post Drivers

- Stand well back from a revolving auger while it is either in or out of the ground.
- Never straighten a post by hand, while the pounder is in place; use a v-stick.
- Stand well back while a post driver is in use and wear safety glasses.
- Do not carry loose tools on tractors or pile loose posts on the equipment.



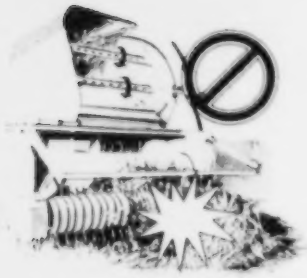
Forage Wagons

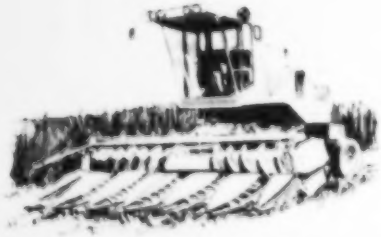
- Tires should be the right type and size for the wagon and load; inspect condition before using. Never equip a wagon with implement tires if it will be towed by a truck at high speed.
- Make sure the tractor has the power, weight, traction and braking power to control the maximum load of the forage wagon and for the conditions under which it will be used. This prevents jackknifing and rollback. Install brakes on equipment that will be heavily loaded to make stopping easier and safer.
- Draw pins should be the proper size and material. They should be locked, to prevent uncoupling. Keep hands and fingers clear of the pinch points while connecting the tongue to the drawbar.
- The PTO must be disengaged and the power shut off before unclogging or working on the equipment.
- Operators must never get into self-unloading wagons when they are in operation.
- The elevated parts of dump wagons must be blocked before any maintenance is done.
- Stay aware when using wagons to avoid falls caused by improper materials handling or by slipping, stumbling or falling from the load or drawbar.
- Wear close fitting clothing and avoid wearing rings or loose jewelry (neck chains, loose watches, etc.) around wagons or equipment.
- Do not allow riders on any of this equipment.
- Stay away from ditches and steep banks and keep well back from overhead power lines and low trees.

- Inspect steering and wheel bearings before using a wagon. Dismantle loose steering and ensure swivel joints fit snuggly and are locked. Lubricate axle bearings and steering systems regularly.
- Use reflectors, lighting and slow moving vehicle signs when wagons are used on public roads. Use safety chains of sufficient strength and rear signal lights if the wagon obscures the tractor lights.
- If possible, outfit wagons with brakes.

Forage Harvesters

- Reduce plugging by using the proper ground speed, making even windrows and using proper weed control practices.
- Disengage PTOs and shut off tractors before dismounting to unplug or service a harvester.
- Stay clear of a harvester while the blower is operating.
- The combined weight of a tractor, forage harvester and forage wagon can be very great. Avoid sudden one-wheel braking and steep side hills. Allow lots of turning space and use the front counterweights on tractors.





Potato Harvesters

- Ensure operators and workers are a safe distance from the machine or in a secure position, before starting a harvester.
- Install appropriate access and guard rails around the sorting area.
- Make sure there are guards for PTO equipment to prevent contact with rotating parts of the power drive.
- Guard all nip points on power-driven gears, belts, chains, sheaves, pulleys, sprockets, idlers and revolving shafts.

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